

**CURRENT LISTING OF CLAIMS**

Claims 1-50 (Canceled).

51. (Previously presented) A composition comprising a thermostable polymerase mutant comprising one or more mutated amino acid residues in the O-helix of a parent thermostable polymerase, said polymerase mutant having polymerase activity and higher fidelity than said parent thermostable polymerase, and a template nucleic acid molecule.

52. (Previously presented) The composition of claim 51, wherein said polymerase is Taq DNA polymerase.

53. (Previously presented) The composition of claim 51, wherein said mutated amino acid residue is adjacent to an immutable or nearly immutable residue.

54. (Previously presented) The composition of claim 53, wherein said mutated amino acid residue is immediately adjacent to an immutable or nearly immutable residue.

55. (Previously presented) The composition of claim 53, wherein said mutated amino acid residue is adjacent to an amino acid residue corresponding to Arg659, Lys663, Phe667 or Tyr671 in Taq DNA polymerase.

56. (Previously presented) The composition of claim 55, wherein said polymerase is Taq DNA polymerase.

57. (Previously presented) The composition of claim 52, wherein said polymerase mutant is a high fidelity mutant.

58. (Previously presented) A composition comprising a Taq DNA polymerase mutant, wherein said polymerase mutant comprises one or more amino acid substitutions selected from the group consisting of Phe667Leu; Asn666Asp; Asn666Ile; Ile665Leu; Leu670Val; Arg660Tyr; Arg660Ser; Gly668Arg; Arg660Lys; Gly668Ser; Gly668Gln; Thr664Ile and Asn666Asp; Ala661Ser and Val669Leu; Ala661Glu, Ile665Thr, and Phe667Leu; and Thr664Pro, Ile665Val and Asn666Tyr, and a template nucleic acid molecule.

59. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Phe667Leu.

60. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Asn666Asp.

61. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Asn666Ile.

62. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Ile665Leu.

63. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Leu670Val.

64. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Arg660Tyr.

65. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Arg660Ser.

66. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Gly668Arg.

67. (Previously presented) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Arg660Lys.

68. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Gly668Ser.

69. (Withdrawn) The composition of claim 58, wherein said polymerase mutant comprises the amino acid substitution Gly668Gln.

70. (Withdrawn) The polymerase mutant of claim 58, wherein said polymerase mutant comprises the amino acid substitutions Thr664Ile and Asn666Asp.

71. (Withdrawn) The polymerase mutant of claim 58, wherein said polymerase mutant comprises the amino acid substitutions Ala661Ser and Val669Leu.

72. (Withdrawn) The polymerase mutant of claim 58, wherein said polymerase mutant comprises the amino acid substitutions Ala661Glu, Ile665Thr, and Phe667Leu.

73. (Withdrawn) The polymerase mutant of claim 58, wherein said polymerase mutant comprises the amino acid substitutions Thr664Pro, Ile665Val and Asn666Tyr.

74. (Amended) A composition comprising a [low fidelity] Taq DNA polymerase mutant, wherein said polymerase mutant comprises one or more amino acid substitutions selected from the group consisting of Ala661Glu; Ala661Pro; Thr664Pro; Thr664Asn; Thr664Arg; Asn666Val; Thr664Pro and Val669Ile; Arg660Pro and Leu670Thr; Arg660Trp and Thr664Lys; Ala662Gly and Thr664Asn; Ala661Gly and Asn666Ile; Ala661Pro and Asn666Ile; and Ala661Ser, Ala662Gly, Thr664Ser and Asn666Ile, and a template nucleic acid molecule.

75. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Ala661Glu.

76. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Ala661Pro.

77. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Thr664Pro.

78. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Thr664Asn.

79. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Thr664Arg.

80. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitution Asn666Val.

81. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Thr664Pro and Val669Ile.

82. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Arg660Pro and Leu670Thr.

83. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Arg660Trp and Thr664Lys.

84. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Ala662Gly and Thr664Asn.

85. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Ala661Gly and Asn666Ile.

86. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Ala661Pro and Asn666Ile.

87. (Withdrawn) The polymerase mutant of claim 74, wherein said polymerase mutant comprises the amino acid substitutions Ala661Ser, Ala662Gly, Thr664Ser and Asn666Ile.

88. (Withdrawn) A composition comprising a thermostable polymerase mutant comprising one or more mutated amino acid residues in the O-helix of a parent thermostable polymerase, said polymerase mutant having polymerase activity and lower fidelity than said parent thermostable polymerase, and a template nucleic acid molecule.

89. (Withdrawn) The composition of claim 88, wherein said polymerase mutant is a low fidelity mutant.

90. (Withdrawn) The composition of claim 89, wherein said polymerase mutant comprises substitution of one or more amino acids selected from the group consisting of Ala661, Thr664, Asn666 and Leu670.

91. (Withdrawn) The composition of claim 88, wherein said polymerase is Taq DNA polymerase.

92. (Withdrawn) The composition of claim 88, wherein said mutated amino acid residue is adjacent to an immutable or nearly immutable residue.

93. (Withdrawn) The composition of claim 92, wherein said mutated amino acid residue is immediately adjacent to an immutable or nearly immutable residue.

94. (Withdrawn) The composition of claim 92, wherein said mutated amino acid residue is adjacent to an amino acid residue corresponding to Arg659, Lys663, Phe667 or Tyr671 in Taq DNA polymerase.

95. (Withdrawn) The composition of claim 94, wherein said polymerase is Taq DNA polymerase.

96. (Previously presented) A composition comprising a thermostable polymerase mutant comprising one or more mutated amino acid residues in the O-helix of a parent thermostable polymerase having the amino acid sequence referenced as SEQ ID NO:2; said polymerase mutant having polymerase activity and altered fidelity relative to said parent thermostable polymerase

97. (Previously presented) The composition of claim 96, further comprising a template nucleic acid molecule.

98. (Previously presented) The composition of claim 96, wherein said mutated amino acid residue is adjacent to an immutable or nearly immutable residue.

99. (Previously presented) The composition of claim 98, wherein said mutated amino acid residue is immediately adjacent to an immutable or nearly immutable residue.

100. (Previously presented) The composition of claim 98, wherein said mutated amino acid residue is adjacent to an amino acid residue corresponding to Arg659, Lys663, Phe667 or Tyr671 in Taq DNA polymerase.

101. (Previously presented) The composition of claim 96, wherein said polymerase has higher fidelity than said parent thermostable polymerase.

102. (Previously presented) The composition of claim 96, wherein said polymerase has lower fidelity than said parent thermostable polymerase.